PROSPECTIVE STUDY OF 100 CASES OF VARICOSE VEINS

DESSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF

THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF

M.S.(GENERAL SURGERY)

TIRUNELVELI

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CERTIFICATE

This is to certify that the dissertation titled "Prospective study of 100 cases of varicose veins" is the original work done by Dr.M.Rajiv, Post graduate in Department of General Surgery, Tirunelveli, to be submitted to the Tamil Nadu Dr.M.G.R.Medical University, Chennai-32 towards the partial fulfillment of the requirement for the award of M.S.Degree in General Surgery April 2013.

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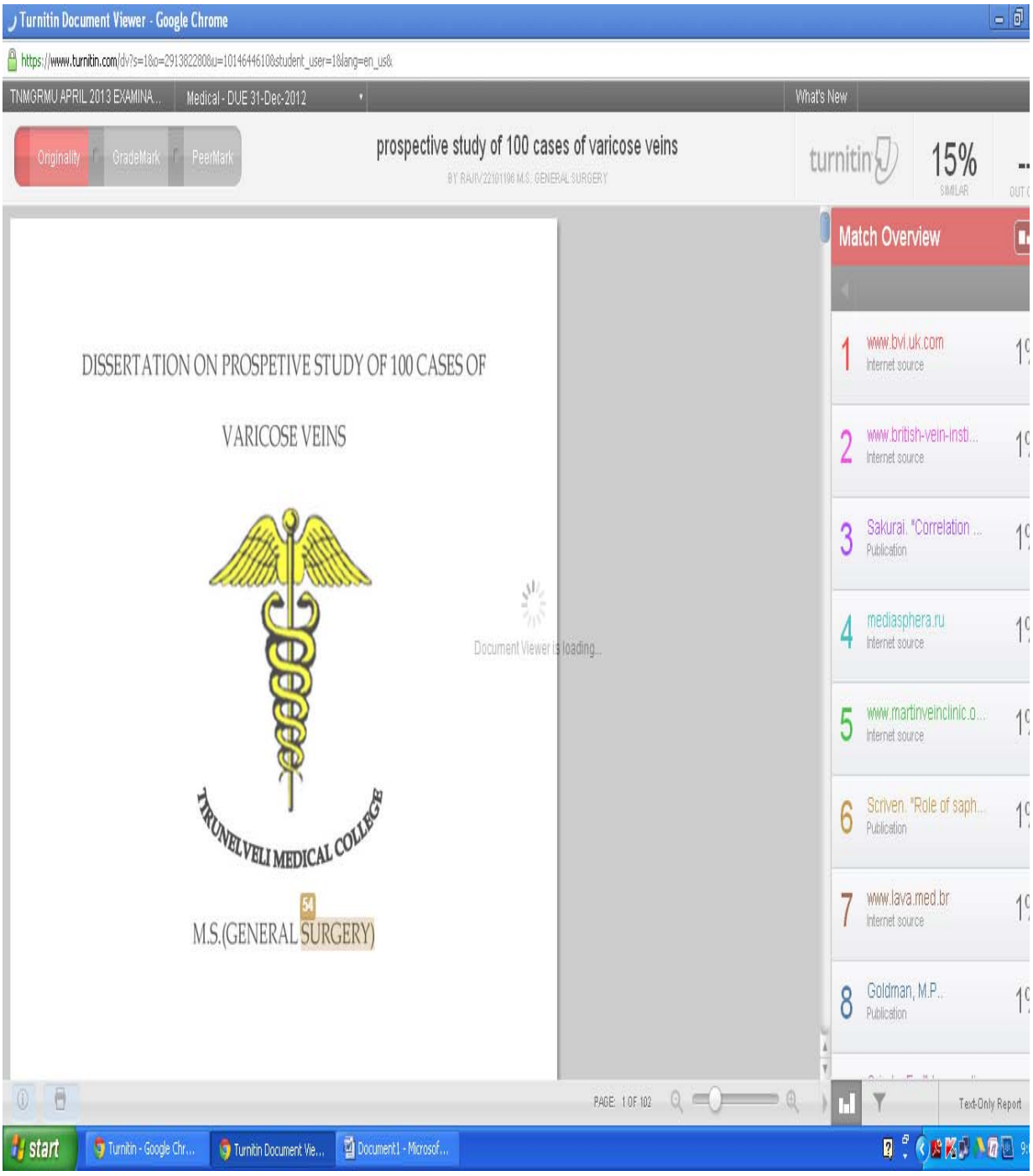
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LIST OF ABBREVIATIONS

ATV	-- Anterior Tibial Vein
Agri	-- Agriculturist
APTT	-- Activated Partial Thromboplastin Time
AVP	-- Ambulatory Venous Pressure
Bui	-- Business
CS	-- Communicating System
CFV	-- Common Femoral Vein
CEAP	-- Clinical, Etiological, Anatomical, Pathophysiological
CWD	-- Continuous Wave Doppler
DFV	-- Deep Femoral Vein
D-PPG	-- Digital Photoplethysmography
DVT	-- Deep Vein Thrombosis
DTU	-- Did not turn up
EVLT	-- Endovenous laser treatment
FDA	-- United States Food and Drug Administration
FV	-- Femoral vein
GSV	-- Great Saphenous vein
H	-- Haematoma
HW	-- Housewife
LSV	-- Long Saphenous Vein

LSVS -- Lateral (Subdermic) venous system

MPEF -- Muscle Pump Ejection Fraction

MVO -- Maximum Venous Output

N -- Neuritis

OPD -- Out Patient Department

PE -- Pulmonary embolism

PV -- Popliteal vein

PTV -- Posterior tibial vein

PPG -- Photoplethysmography

PT -- Prothrombin time

RF -- Radiofrequency

SSV -- Short Saphenous Vein

SEPS -- Subfascial Endoscopic Perforator Surgery

SFJ -- Saphenofemoral Junction

SPJL -- Saphenopopliteal Junction Ligation

SFFL -- Saphenofemoral Flush Ligation

SFLP -- Subfascial Ligation of Perforators

S -- Stripping

ST -- Student

WBC -- White Blood Cell

VRT -- Venous Refilling Time

ABSTRACT

Background and objectives: Venous diseases of lower limb remain common affecting 20% of adult population. Objective of this study is to identify cases with primary varicose veins, evaluate with appropriate investigations, collect data and establish the clinical spectrum of complications in this population.

Methods: A **prospective study** was conducted on **100 consecutive patients with primary varicose veins at Tirunelveli Medical College** and hospital, Tirunelveli. All cases of varicose veins presenting to the OPD were subjected to doppler study to rule out secondary causes. Patients admitted with varicose veins who satisfied the inclusion and exclusion criteria were included in the study.. Patients who presented with bilateral disease got their symptomatic limb

operated first while the other limb was treated conservatively Patients with saphenofemoral incompetence were treated with saphenofemoral junction ligation and stripping of long saphenous vein. Patients with saphenopopliteal junction incompetence were treated with saphenopopliteal junction ligation with or without stripping of short saphenous vein. Patients with perforator incompetence were treated

with multiple phlebectomies.

CONTENTS

LIST OF GRAPHS

I. INTRODUCTION

Venous diseases of lower limb remains common affecting 20% of adult population. In general these cause no major life threatening illness and yet the morbidity of venous ulceration places a substantial burden on the community health care and results in expenditure of large sums on daily management of this problem. Despite the frequency of venous disease, surprisingly little is understood of the circumstances that lead to valvular incompetence, or the mechanisms by which chronic venous insufficiency leads to venous ulceration. Our understanding of the fundamental pathologic processes has advanced considerably in the last decade and a reappraisal of these diseases is now needed. Technological advances in particular colour duplex ultrasonography now offers improved diagnostic accuracy in patients with venous disease. This should be the minimum investigation before undertaking any operation for venous diseases of the lower limb. Venous ulceration may be partially attributable to failure of the microcirculation of the skin to provide nutrition, but inflammatory mediators and toxic products from inflammatory cells probably play a major part in causing the skin damage. Complex venous disease may be comprehensively investigated using duplex ultrasound

imaging combined with a plethysmographic method of assessing venous function. Sclerotherapy remains an effective treatment for selected patients presenting with varices in the absence of major truncal incompetence, or in whom long saphenous or short saphenous has been treated surgically. During surgical treatment, stripping of long saphenous vein is preferable to sapheno-femoral ligation alone. The latter course of action allows venous reflux to persist in the trunk of long saphenous vein in over 50% of cases. A better clinical outcome will be achieved particularly in patients with chronic venous insufficiency, when all sources of venous reflux have been controlled. Combined with surgery through small sized incision more aesthetic results will be achieved in patients with varicose veins.

TYPES:

1. Long saphenous vein varicosity.
2. Short saphenous vein varicosity.
3. Varicose veins due to perforator incompetence.
4. Thread veins (or dermal flares / telangiectasis / spider veins are 0.5 – 1mm in size): Are small varices in the skin usually around ankle which look like dilated, red or purple network of veins.
5. Reticular varices (1-3 mm in size): Are slightly larger varices than thread veins located in subcutaneous region.
6. Combinations of any of above.

   Small varicose vein is < 3 mm in diameter. Large varicose vein is > 3 mm in diameter.

II. MATERIALS AND METHODS

Among the patients admitted as primary varicose veins in Tirunelveli Medical College, during the period from Jan 2011 to July 2012 were taken and a prospective study was done.

Detailed clinical evaluation of the state of patient at the time of admission and progress were followed up. The incidence in relation to age, sex, condition of the patient at the time of admission were studied.

The different approaches for the varied presentation of varicose veins and their outcome were studied. All patients were followed up in the immediate post-operative period and also subsequently for a period to 6 months.

III. AIMS OF STUDY

1. To analyse the incidence of varicose vein in Tirunelveli Medical College, Tirunelveli.
2. To analyse age distribution.
3. Male : Female ratio.
4. Incidence of ulcer in varicose vein patients.
5. Post-operative complications.
6. Percentage of recurrence in 6 months of follow up .

OBJECTIVES OF THE STUDY

1. To identify all admissions with primary varicose veins.

2. To evaluate patients having primary varicose veins with appropriate investigations and recognize complications.

3. To collect data and establish the clinical spectrum of complications in this population.

4. To suggest measures to improve patients understanding in order to prevent complications

IV.ANATOMY OF VEINS OF LOWER LIMB

Deep veins:

1. Tibial, popliteal, femoral veins are called as "veins of conduits" which drain blood into iliac veins and then to IVC.
2. Pumping veins: They are venous sinuses existing in the calf muscles which pump blood towards major veins. They are better termed as musculovenous pumps. They are also called as the peripheral heart.

Superficial veins:

- Long saphenous vein: It is a subcutaneous vein over the inner aspect of the leg and thigh, joins into femoral vein at fossa ovalis. Tributaries of long saphenous vein are posterior arch vein, anterior vein of leg, anterolateral vein, postero medial vein and sometimes accessory saphenous vein.
- Short saphenous vein : It is over the lateral and posterior aspect of the leg enters the deep fascia in the upper calf region and later joins popliteal vein at variable distance.
- Posterior arch vein of 'Leonardo' (from medial ankle to the long saphenous vein below the knee).
- Anterior arch vein to peroneal veins.

Superficial veins have got multiple valves which facilitates blood flow towards heart. Superficial veins usually drain about 10% of lower limb blood i.e. from skin and subcutaneous tissues.

Perforator veins:

They are the veins which connect superficial to deep veins at various levels. They travel from superficial fascia through an opening in the deep fascia before entering the deep veins. The direction of blood flow here is from superficial to deep veins. These perforators are also guarded by valves so that the blood flow is unidirectional, i.e. towards deep veins. Reversal of flow occurs due to incompetence of perforators which will lead to varicose veins.

Physiology of venous blood flow in lower limb:

Veins are thin-walled vessels with collapsible walls, that assume an elliptical configuration in collapsed state and circular configuration in the filled state.

Venous valves are abundant in the distal lower extremity and the number of valves decreases proximally, with no valves in superior and inferior vena cava.

Venous return:

1. Arterial pressure across the capillary increases the pumping action of vein.
2. Calf musculovenous pump: During contraction phase of walking, pressure in the calf muscles increases to 200 – 300 mmHg. This pumps the blood towards the heart. During relaxation phase of walking, pressure in the calf falls and so it allows blood to flow from superficial to deep veins through perforators. Normally while walking, pressure in the superficial system at the level of ankle is 20 mm Hg.
3. During walking, foot pump mechanism propels blood from plantar veins into the leg.
4. Gravity.

Factors responsible for venous return:

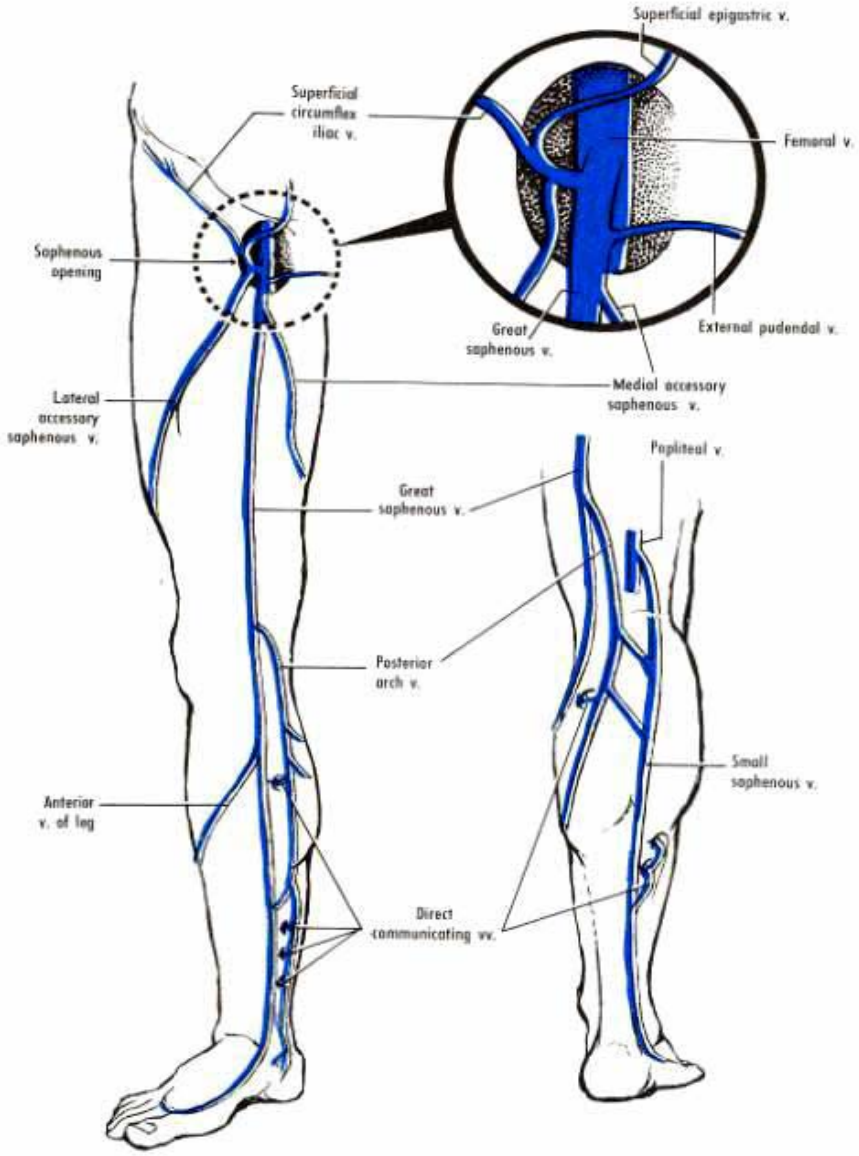
1. Negative pressure in thorax.
2. Peripheral pump – calf muscles.
3. Vis–a–tergo of adjoining muscles.
4. Non refluxing valves in course of veins.

Perforator – Anatomy

1. Adductor canal perforator : Between femoral vein and great saphenous vein
2. Below knee perforator : Between posterior tibial vein and great saphenous vein
3. Lower leg perforator s : Between posterior tibial vein and posterior arch vein (tributary of GSV)
4. Ankle perforators : Inconstant perforators to posterior final and plantar veins
5. Lateral perforators : Between peroneal vein and short saphenous vein.

Perforators of lower limb –landmark:

1. Adductor (hunterian) canal perforator : Palm breadth above knee (DODD)
2. Below knee perforator : Just below knee (BOYD)
3. Lower leg perforators : Three in numbers (COCKETT)
    1. Posteroinferior to medial malleolus
    2. 10cm above medial malleolus
    3. 15cm above medial malleolus
4. Ankle perforators : Inconstant (may or kuster)
5. Lateral perforator


Superficial epigastric v.
Superficial circumflex iliac v.
Femoral v.
Saphenous opening
Great saphenous v.
External pudendal v.
Medial accessory saphenous v.
Lateral accessory saphenous v.
Popliteal v.
Great saphenous v.
Posterior arch v.
Small saphenous v.
Anterior v. of leg
Direct communicating vv.

Anatomy

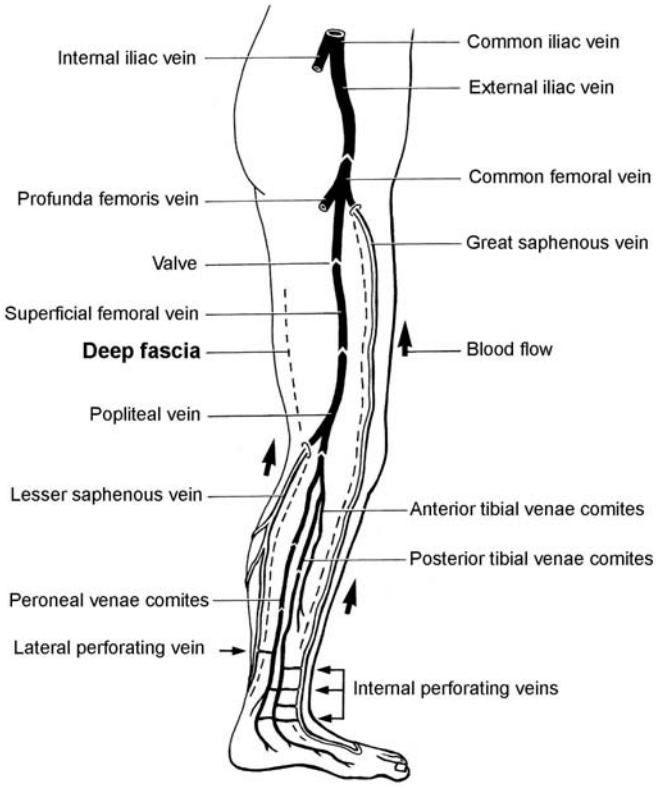


Diagram 2

V. CLASSIFICATION OF VARICOSE VEIN

CLASSIFICATION OF CHRONIC LOWER EXTREMITY VENOUS DISEASE

CEAP CLASSIFICATION[21].

Clinical classification

Etiologic classification

Anatomic classification

Pathophysiologic classification

Clinical classification

Class 0 no visible or palpable signs of venous disease

Class 1 telangiectasia, reticular veins,malleolar flare.

Class 2 varicose veins

Class 3 edema without skin changes

Class 4 skin changes ascribed to venous disease (pigmentation, eczema,lipodermatosclerosis)

Class 5 skin changes with healed ulceration

Class 6 skin changes with active ulceration.

Etiologic classification (E$_C$ E$_P$ or E$_S$),

Congenital(E$_C$) chronic venous disease present since birth.

Primary (E$_P$) chronic venous disease of undetermined cause.

Secondary (E$_S$) chronic venous disease with an associated known cause

Primary varicose veins

1. Congenital weakness in vessel wall or congenital absence of valves.
2. Incompetance of main vein or communicating vein.
3. Primary varicosity can also be familial

These factors in addition to prolonged standing help in varicose vein formation.

Secondary varicose veins

1. Obstruction to venous outflow:

    Pregnancy

    Pelvic mass (ovary, fibroid)

    Abdominal lymphadenopathy

    Ascites

    Retroperitoneal fibrosis

    Iliac vein thrombosis

2. Destruction of valves due to deep vein thrombosis:

    Oral contraceptive pills

    Progesterone

3. High pressure flow:

    A – V fistula.

Anatomic classification

Segment no	**vein(s)**
Superficial veins(A_{S1-5})	
	telangiectasia/reticular veins
great saphenous vein	
	above knee
	below knee
segment no	**vein(s)**
short saphenous vein	
5	non saphenous
deep veins (A_{D6-16})	
6	inferior venacava
	iliac
7	common
8	internal
9	external
10	pelvic: gonaldal, broad ligament Femoral
11	common
12	deep
	Superficial
	popliteal
	tibial (anterior, posterior or peronial)
	muscular (gastrointestinal, soleal, other)

perforating veins ($A_{P17,18}$)

thigh

calf

Pathophysiologic classification ($P_{R,O}$)

Reflux (P_R)

obstruction (P_o)

reflux and obstruction ($P_{R,O}$)

VI.DIAGNOSTIC APPROACHES IN VARICOSE VEIN

1. **Venous Doppler:**

With the patient standing, the Doppler probe is placed at saphenol-femoral junction and later wherever required. Basically by hearing the changes in sound, venous flow, venous patency, venous reflex can be very well-identified.

2. **Duplex scan** is a highly reliable U/S Doppler imaging technique (here high resolution B mode ultrasound imaging and Doppler ultrasound is used) which along with direct visualization of veins, gives the functional and anatomical information, and also colour map. Examination is done in standing lying down position and also with valsalva manoeuvre. Hand-held Doppler probe is placed over the site and visualized for any block and reversal of flow. DVT is very well-identified by this method.

Venous Haemodynamic Mapping / VHM / Cartography is essential prior to surgery.

Venous Doppler in varicose veins

- To find out DVT very important
- To find out sapheno-femoral, sapheno-popliteal incompetence

- To find out perforator incompetence
- Uniphasic signals signify flow in one direction – normal
- Biphasic flow signifies reversal flow with incompetence

3. Venography:

- Ascending venography was very common investigation done before Doppler period.

  A tourniquet is applied above the malleoli and vein of dorsal venous arch of foot is cannulated. Water soluble dye injected, flows into the deep veins (because of the applied tourniquet). X-rays are taken below and above knee level. Any block in deep veins, its extent, perforator status can be made out by this.

It is a good reliable investigation for DVT.

If DVT is present, surgery or sclerotherapy are contraindicated.

- Descending venogram is done when ascending venogram is not possible and also to visualize incompetent veins. Here contrast material is injected into the femoral vein through a cannula in standing position. X-ray pictures are taken to visualize deep veins and incompetent veins.

Phelbography

- Ascending phlebography defines obstruction.
- Descending phlebography identifies valvular incompetence
- Regularly not required to be done.

4. **Plethysmography:** It is a noninvasive method which measures volume changes in the leg.

   - **Photo plethysmography** – Using probe transmission of light through the skin, venous filling of the surface venules which reflects the superficial venous pressure is measured. Initially patient performs dorsiflexion at ankle for 10 times to empty the venules and pressure tracing falls in photo plethysmography. Patient takes rest and refilling occurs. In normal people, it occurs through arterial inflow in 20 – 30 seconds. In venous incompetence filling also occurs by venous reflux and so refilling time is faster than normal.

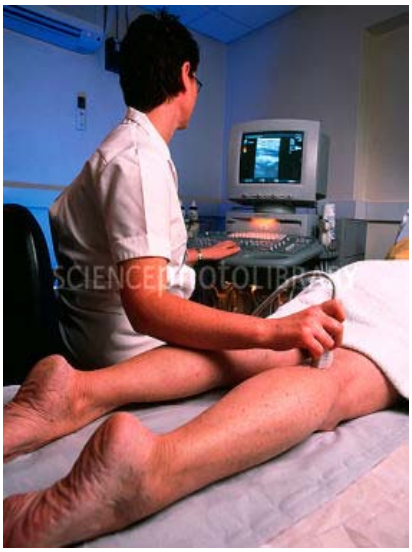
     Disadvantage: Site of reflux cannot be localized by this method.

   - **Air plethysmography** – Patient is initially in supine position with veins emptied by elevation of leg. Air filled plastic pressure bladder is placed on calf to detect volume changes. Minimum volume is recorded. Patient is turned to upright position and venous volume is assessed. Maximum venous

volume divided by time required to achieve maximum venous volume gives the venous filling index (VFI). VFI is a measure of reflux. Ejection fraction is volume change measured prior and after single tiptoe maneuver which is a measure of calf pump action. Residual venous fraction is an index of overall venous function which is venous volume in the leg after ten toetip maneuvers divided by venous volume prior to maneuver. Increased VFT and diminished ejection fraction in a patient will benefit from surgery.

5. **Ambulatory venous pressure (AVP):** It is an invasive method. Needle inserted into dorsal vein of foot is connected to transducer to get its pressure which is equivalent to pressure in the deep veins of the calf. Ten tiptoe manoveuvers are done by the patient. With initial rise in pressure, pressure decreases and eventually stabilizes with a balance. Pressure now is called as ambulatory venous pressure (AVP). After stopping exercise, veins are allowed to refill with return of pressure to baseline. Time required for pressure to return to 90% of baseline is called as venous refilling time (VRT). Raise in AVP signifies venous hypertension. Patients with AVP more than 80mm Hg has got 80% chances of venous ulcer formation.

6. **Arm-Foot venous pressure:** Foot pressure is not more than 4mm Hg above the arm pressure.
7. **U/S abdomen**, peripheral smear, platelet count, other relevant investigations are done depending on the cause of the varicose veins.
8. If venous ulcer is present, then the discharge is collected for culture and sensitivity, biopsy from ulcer edge is taken to rule out Marjolin's ulcer.
9. Plain X-ray of the part is taken to look for periostitis.
10. **Varicography:** Here non-ionic, iso-osmolor, non-thrombogenic contrast is injected directly into the variceal vein to get a detailed anatomical mapping of the varicose veins. It is used in recurrent varicose veins.



VII. REVIEW OF LITERATURE

Primary varicose veins of leg are bothersome, particularly when associated with complication such as lipodermatosclerosis and ulceration. Valvular incompetence of superficial and perforating veins is considered the main pathological feature. Because the patients with varicose veins may have valvular incompetence in the superficial, perforating and deep venous system alone, or in combination, it is difficult to determine which abnormality has maximum bearing on complications. With the application of duplex colour doppler imaging the incidence and anatomical distribution of venous reflux can be determined non-invasively in patients with varicose veins. Accurate non-invasive evaluation using duplex colour doppler ultrasonography help to determine the best operative strategy.

Varicose veins affect three times more women than men. Chronic venous insufficiency and venous ulceration affects at least 1% of population with greatly increased prevalence over the age of 65 years. Many operations have been described, but restorative surgery of deep veins remains largely experimental and applicable to only a small section of population of patients with chronic venous insufficiency. Where skilled technologist is available with experience in venous imaging, colour doppler ultrasonography is the investigation of choice.

Venous ulceration results from prolonged venous hypertension. In upto 57 % of cases this is due to saphenous vein reflux alone, but in upto 32% of cases there is in addition deep venous reflux. Darke and Penfold have demonstrated that saphenous vein ligation with stripping to the knee(combined with post-operative compression in 1/3 of cases) results in ulcer healing if deep veins are competent, controversy exists regarding role of saphenous vein surgery, when there is co-existing deep vein reflux. Scurr has advocated saphenous vein surgery whereas Mayberry et al consider that this approach is unproven.

Venous reflux is the primary cause of chronic venous ulceration, where as venous outflow obstruction is a factor in 5-12% of cases. All patients with chronic venous ulceration ideally should undergo an initial duplex scan of venous system. Graded compression therapy and elevation at rest remain the mainstay of treatment and are successful in most patients. Although ligation and stripping of long saphenous vein remains standard procedure, new modalities of treatment have arrived as an alternative to surgical stripping. These include Endovenous laser treatment [EVLT] and Radiofrequency occlusion [closure procedure]. Small varicosities & spider veins are managed by sclerotherapy.

Definition:

Dilated, elongated and tortuous superficial veins of the limb are called as varicose veins.

Hypothesis of varicosity and its pathophysiology:

1. Ambulatory Venous Hypertesion

VARICOSE VEIN IS ONE WHICH PERMITS REVERSE FLOW VIA ITS FAULTY VALVE.

Normal pressure in

i. Superficial venous system	: Rest	: 80 – 100mm Hg
	Walking	: 20 mm Hg
ii. Deep venous system	: Walking	: 200 – 300 mm Hg

- The failure to decrease the superficial venous pressure to 20mm Hg on walking is called ambulatory venous hypertension.

2.Fibrin Cuff Hypothesis

- Increased superficial venous pressure results in venous hypertension
- Main focus of damage is in capillaries hence capillaries increase in size and length (glomerulus like)
- Fibrotric process occurs associated with inflammatory cells (macrophages) and results in perivascular cuff made of fibrin, collagen IV, fibronectin.

- The perivascular cuff acts as a barrier to diffusion of nutrients between capillaries and tissues resulting in ulceration and lipo dermatosclerosis.

Incompetence of venous valves

↓

Stasis of blood

↓

Chronic ambulatory venous hypertension

↓

Defective microcirculation

↓

RBC diffuses into tissue planes

↓

Lysis of RBC's

↓

Release of haemosiderin

↓

Pigmentation

↓

Dermatitis

↓

Capillary endothelial damage

↓

Prevention of diffusion and exchange of nutrients

↓

Severe anoxia

↓

Chronic venous ulceration (Fibrin cuff theory)

3. White Cell Trapping Hypothesis:

- Venous hypertension results in leucocyte sequestration.

Trapped WBC's activate and release proteolytic enzymes resulting in damage to capillary endothelium and ulceration. Fibrin deposition, tissue death, scarting occur together, called as lipodermatosclerosis.

- ❖ Secondary valvular failure → venous reflux → venous wall dilatation → effects. Weaking of the venous endothelial wall and valves occur due to raised venous wall tension by – (1) Shearing stress pressures of blood flow (2) Increased matrix metalloproteinases (MMPs) activity on endothelium and smooth muscle cells reducing structural integrity of venous wall with decreased elastin content in the media of the vein, (3) changes in normal venous constriction and relaxation properties (4) Recurrent inflammation.
- ❖ Venous system in the lower limb is maintained by

  (1) valvular competence

(2) venous patency

(3) calf muscle pump which is venous channel / plexus within the soleus muscle.

- ❖ Any change in any of these systems can cause venous insufficiency.
- ❖ Chronic venous insufficiency (CVI) is a syndrome resulting from continuous chronic venous hypertension / ambulatory venous hypertension (AVP) (>80mm Hg venous pressure at ankle) in the crept posture either on standing or exercise (in normal people venous pressure in superficial system falls varicose veins, oedema, pigmentation, induration, dermatitis, lipodermatosclerosis and ulceration. CVI patients may be having superficial vein incompetence (30%) with or without perforator incompetence or deep vein incompetence (30%) or having previous DVT with complete obliteration or partial recanalisation with incompetence called as post thrombotic syndrome (30%).
- ❖ Varicose vein is a condition of progressive deterioration even often with interventions.

Clinical features:

Symptoms in varicose veins:

- Dragging pain
- Heaviness in the legs

- Night time cramps – usually late night
- Oedema feet
- Discolouration / ulceration in the feet / painful walk

  Causes of pain / cramps in varicose veins / venous diseases.

- Increased venous wall tension – chronic venous hypertension.
- Hypoxia of tunica media of the venous wall due to altered function of vasa vasorum.
- Increased capillary pressure
- Hyperviscosity of red cells – haemorrheological disorders
- Platelet hyperaggregation
- Reduction in capillary permeability causing capillary functional disorder.
- Altered cutaneous microcirculation due to leukocyte adhesion and accumulation into the venous wall; release of free radicals cause microvascular lesional disease.

Oedema in venous diseases:

- Can be localized or generalized
- Localised oedema is due to ankle flare or dilatation of medial marginal vein.
- Cellulitis and lymphangitis association causes oedema.

- Scarring and thickening of dermal and subdermal tissues – lipodermatosclerosis (brawny induration)
- Ankle becomes narrower due to contraction of skin and subcutaneous tissues but calf remains prominent – champagne bottle appearance.
- Pale atrophic skin with white patches surrounded by dilated capillaries and pigmentation – atrophic blanche.

Examination:

1. Visible dilated veins in the leg with pain, distress, nocturnal cramps, feeling of heaviness, pruritus.
2. Pedal oedema, pigmentation, dermatitis, ulceration, tenderness, restricted ankle joint movement.
3. Bleeding thickening of tibia occurs due to periostitis.
4. Positive cough impulse at the sapheno-femoral junction.

   Saphena varix – a large varicosity in the groin, which becomes visible and prominent on coughing.
5. Brodie-Trendelenburg test: Vein is emptied by elevating the limb and a tourniquet is tied just below the sapheno-femoral junction (or using thumb, sapheno-femoral junction is occluded). Patient is asked to stand quickly. When tourniquet or thumb is released, rapid filling from above signifies sapheno-femoral incompetence. This is trendelenburg test I.

In Trendelenburg test II, after standing tourniquet is not released. Filling of blood from below upwards rapidly can be observed within 30-60 seconds. It signifies perforator incompetence.

6. Perthe's test: The affected lower limb is wrapped with elastic bandage and the patient is asked to walk around and exercise. Development of severe cramp like pain in the calf signifies DVT.
7. Modified Perthe's test: Tourniquet is tied just below the sapheno-femoral junction without emptying the vein. Patient is allowed to have a brisk walk which precipitates bursting pain in the calf and also makes superficial veins more prominent. It signifies DVT

   DVT is contraindicated for any surgical intervention of superficial varicose veins. It is also contraindicated for sclerosant therapy.
8. Three tourniquet test: To find out the site of incompetent perforator, three tourniquets are tied after emptying the vein.
   1. at sapheno-femoral junction
   2. above knee level
   3. another below knee level

   Patient is asked to stand and looked for filling of veins and site of filling. Then tourniquets are released from below upwards, again to see for incompetent perforators.

9. Schwartz test: In standing position, when lower part of the log saphenous vein in leg is tapped, impulse is felt at the saphenous junction or at the upper end of the visible part of the vein. It signifies continuous column of blood due to valvular incompetence.
10. Pratt's test: Esmarch bandage is applied to the leg from below upwards followed by a tourniquet at sapheno-femoral junction. After that the bandage is released keeping the tourniquet in the same position to see the "blow outs" as perforators.
11. Morrissey's cough impulse test: The varicose veins are emptied. The leg is elevated and then the patient is asked to cough. If there is sapheno –femoral incompetence, expansile impulse is felt at saphenous opening. It is a venous thrill due to vibration caused by turbulent backflow.
12. Fegan's test: On standing, the site where the perforators enter the deep fascia bulges and this is marked. Then on lying down, button like depression (crescent like) in the deep fascia is felt at the marked out points which confirms the perforator site.
13. Ian-Aird test: On standing, proximal segment of long saphenous vein is emptied with two fingers. Pressure from proximal finger is released to see the rapid filling from above which confirms sapheno-femoral incompetence.

14. Examination of the abdomen has to be done to look for pelvic tumours, lymph nodes, which may compress over the veins to cause varicosity.

    Venous segmental disease score (venous clinical scoring system) is done based on different symptoms/signs /ulcer activity/compression therapy with 10 parameters with each having 3 scores as mild /moderate/severe.

Treatment:

1. **Conservative treatment:**
    - Elastic crepe bandage application from below upwards or use of pressure stockings to the limb – pressure gradient of 30 – 40 mm Hg is provided.
    - Diosmin therapy which increases the venous tone.
    - Elevation of the limb – relieves oedema.
    - Unna boots – provide nonelastic compression therapy. It comprises a gauze compression dressings that contain zinc oxide, calamine, and glycerine that helps to prevent further skin break down. It is changed once a week.
    - Pneumatic compression method – provide dynamic sequential compression.

2. **Drugs used for varicose veins:**

    - Calcium dobesilate – 500 mg BD. Calcium dobesilate improves lymph flow; improves macrophage mediated proteorysis; and reduces oedema.
    - Diosmin – 450 mg BD
    - Diosmin 450 mg + Hesperidin 50 mg (DAFLON 500 mg). Mainly used in relieving night cramps but not to improve healing of ulcers.
    - Toxerutin 500 mg BD, TID. Anti erythrocyte aggregation agent which improves capillary dynamics.

      Benefits of all these drugs are doubtful.

Scrlerotherapy: (Fegan's Technique)

Ideal Sclerosant

1. Virtually any foreign substance can cause venous endothelial damage.
2. An ideal sclerosing solution would have no systemic toxicity.
3. It would produce local endothelial destruction extending all the way to the adventitia with a minimum of thrombus formation.
4. Because all sclerosants eventually flow into the deep system, an ideal sclerosant would be rapidly inactivated by dilution. It would require a long period of contract to be effective, making

it more effective in areas of stasis and safer in normal veins where three is high flow.

5. It would be non-allergenic.
6. It would be strong enough to sclerose even the largest vessels, yet it would produce no local tissue injury if extra vacates.
7. It would not cause staining or scarring, not telangiectatic matting.
8. It would be perfectly soluble in normal saline. It would be painless upon injection, inexpensive, and approved by the United Status Food and Drug Administration (FDA).

At present there is no ideal sclerosing agent

Principles of large vein sclerotherapy

1. Identify and treat specific reflux points
2. The order of treatment is proximal to distal
3. Treat larger veins before smaller veins
4. Empty vein of blood by various maneuvers
5. Treat entire varicosity at one time
6. Compress immediately and adequately
7. Patient ambulates following treatment

Sclerosants used are –

- Sodium tetradecyl sulphate 3 % (STDS) – commonly used
- Sodium morrhuate
- Ethanolamine oleate
- Polidocanol

Mechanism of action

- Causes aseptic inflammation
- Causes perivenous fibrosis leading to block
- Causes approximation of intima leading to obliteration by endothelial damage
- Alters intravascular pH / osmolality
- Changes surface tension of plasma membrane

Contra indications for sclerotherapy

- Sapheno femoral incompetence
- Deep venous thrombosis
- Huge varicosities – may precipitate DVT
- Peripheral arterial diseases
- Hypersensitivity / immobility
- Venous ulcer – relative contraindication

Remember about sclerotherapy

- Current place of sclerotherapy is mainly for recurrent varicosities and thread / telangiectatic veins
- Sodium tetradecyl sulphate (STDS) is most commonly used sclerosant
- Hyperpigmentation is common after STDS
- Anaphylaxis is common after sodium morrhuate
- Anaphylaxis is least with polidocaol
- Extravasation (presence of pain / irritation / burning) should be avoided as it will cause skin necrosis
- Post sclerotherapy walking immediately after injection for 30 minutes with elastic bandage in place prevents / minimises the chances of DVT
- Compression bandage should be worn for minimum period of 6 weeks
- Sclerotherapy can be – macrosclerotherapy; microsclerotherapy; echo (ultrasound guided) sclerotherapy; foam sclerotherapy; transilluminated sclerotherapy.

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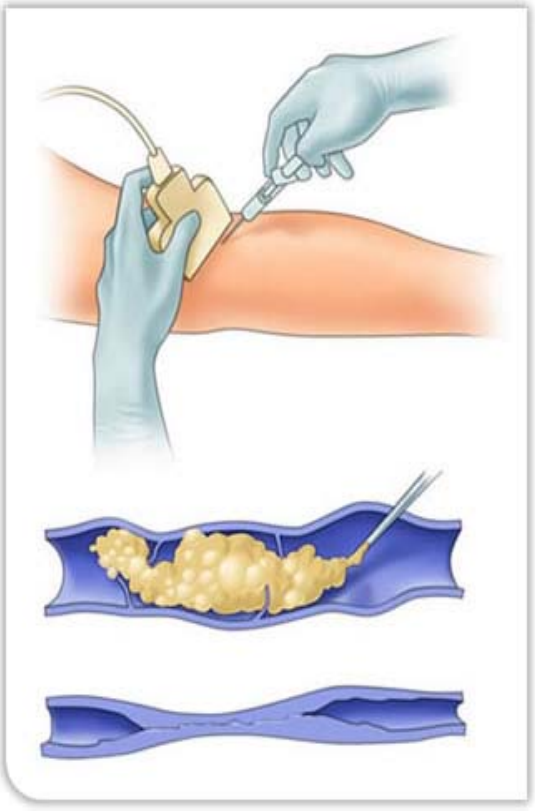


RECENT ADVANCE:

CATHETER DIRECTED SCLEROTHERAPY

Doctors at Miami vein clinic devised special catheters for Sclerosant injection, to have a more controlled. Obliteration of the veins without risk of systemic embolisation. A specific length of the catheter has side holes, all around it, for uniform contact with the foam. It also has balloon at the tip, which when inflated. Shuts of the SFJ and prevents embolization of the foam. It has 3 extend ports, balloon inflation, injection and a bladder valve port. The entire catheter is inserted into the vein ,and injections are through the ports. Drawback of the procedure is unavailability of various sizes of catheters.

SURGERY:

a. Trendelenburg operation (Crossectomy): It is juxta-femoral flush ligation of long saphenous vein (i.e. flush with femoral vein) after ligating named (superficial circumflex, superficial external pudendal vein and unnamed tributaries. All tributaries should be ligated, otherwise recurrence will occur. Double saphenous vein is the commonest anomaly occurring near sapheno-venous junction.
b. Stripping of vein: Using Myer's stripper vein is stripped off. Stripping from below upwards is technically easier. Immediate application of crepe bandage reduces the chance of bleeding and

haematoma formation. Stripping avulses the vein as well as obliterates the tributaries. Babcock's stripper and rigid metal pin stripper can also be used.

Stripping of the short saphenous vein is done from ankle below upwards after passing stripper from above downwards. It obliterates the mid calf perforator vein which is the common reason for recurrences.Ensure all tributaries are ligated and perforators secured.

c. Subfascial ligation of Cockett and Dodd: Perforators are marked out by Fegan's method. Perforators are ligated deep to the deep fascia through incisions in antero medial side of the leg.
d. Ligation of short saphenous vein at sapheno popliteal junction. It is done in prone position with horizontal incision. Variations in SP junction are common. But stripping is better.
e. Removal of superficial varicose veins by hook phlebectomy.
f. Linton's vertical approach – subfascial ligation of perforators.
g. Stab avulsion of varicose vein and perforators. Avulsion is done using mosquito forceps or avulsion hooks. Multiple incisions are made and veins are carefully and gently avulsed / teased to clear it. Post operative compression bandage is a must.
h. Subfascial endoscopic perforator ligation surgery (SEPS). It is becoming cosmetically popular.

i. Radiofrequency ablation (RFA) method (VNUS closure method) This procedure is done under general or regional anesthesia. A RFA catheter is passed into long / short saphenous vein near sapheno femoral or sapheno-popliteal junction under guidance. 85^0C temperature is used for longer period of time to cause endothelial damage, collagen denaturation and venous constriction. Phlebectomy is done while withdrawing the catheter. Wall of the vein is destroyed through its full thickness. Vein forms a cord, which gets dissolved by macrophages and immune cells.

j. Trivex method: Under subcutaneous illumination and local anaesthesia, a large quantity of fluid is injected percutaneously to identify the superficial veins under. Tumescent anaesthesia created causes hydrodissection. Trivex resector and illuminator are placed under the skin. Resector gently extracts veins by suction and morecellation. Further stages of tumescence flushes all blood and delivers vasoconstriction solutions. Solution is passed through 18 gauze needle to clear all blood underneath. Method is cosmetically acceptable; removes all sized veins; achieves good pain relief; with minimal complications like bruising, induration which gets resorbed eventually; and can be used when there are venous ulcers.

k. Endo venous laser ablation (EVLA): It is done as an outpatient procedure or as day care surgery. Patient lies supine with diseased leg flexed, hip externally rotated and knee flexed. With aseptic precaution, under U/S guidance LSV is cannulated above the knee and a guide wire is passed beyond SFJ and 5- French catheter is passed over guide wire and tip is placed 1 cm distal to the junction. 200ml of 0.1% lignocaine (crystalloid with local anaesthetic) is infiltrated along the length of the LSV. Laser fibre is inserted up to the tip of the catheter and catheter is withdrawn for 2cm and laser fibre protrudes for 2cm. Laser fibre is fired step by step using diode laser, one mm withdrawal in 2 seconds. Once procedure is over catheter is removed and pressure bandage is applied for 2 weeks. Heat produced (729^0C – 1000^0C at tip) by the laser produces steam bubbles with thermal damage of endothelium leading into occlusion of the vein. Laser energy acts on the blood within the vein rather directly through the wall and heats the blood and in turn heats the vein wall. Drawback of laser therapy is inability to create flush occlusion allowing tributaries to open up to cause possible recurrence.

Primary indications of lasers for leg veins:

1. A-V malformations –bright red centre source
2. Ankle telengiactesias

3.Resistance to sclerotherapy

4.Fine matting post-sclerotherapy

5.Hemangiomas(ectasias)-cherry,venous lake

6.Needle phobia.

7.Patients prone to pigmentation from sclerotherapy

(choose wavelength wisely)

l. Obliteration of saphenous trunks with hyperheated steam.

Hyperheated steam for vein obliteration was pioneered by Milleret at al from France. Water is pressured at 600 atmospheres before being forced through a narrow tube into the affected vein. This causes coagulation of tissue and seals the vein. It is also cheap. Larger trails are being conducted for this technique but no face value, it appears to be an attractive procedure in this country.

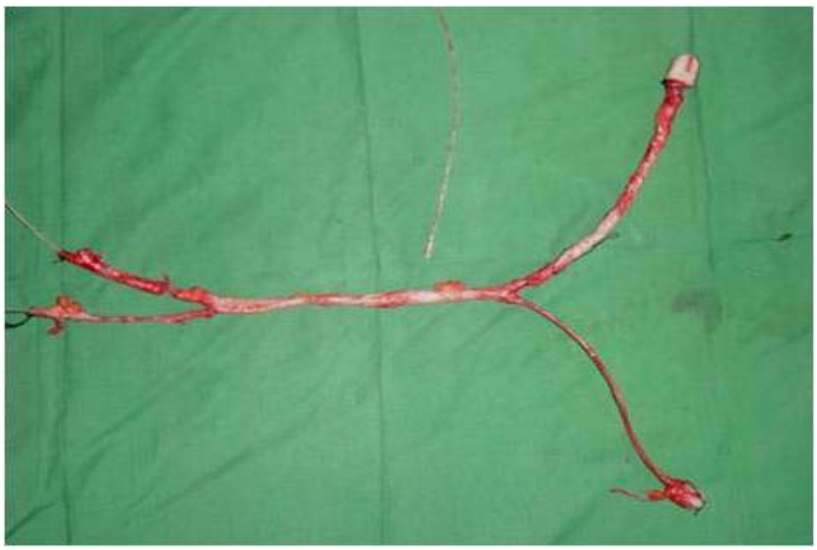
m. Other methods: Transilluminated phlebectomy is done by passing transilluminating light under the skin and passing a rotating blade through another small incision. Veins are grasped and removed by rotating movements. Ambulatory phlebectomy is done through tiny small incisions using special phlebectomy instruments. Electrodessication using weak electric current through a fine needle directly into the spider veins (telangiectasis) is also used.

Problems in varicose vein surgery:

- Infection – 10%
- Haematoma formation
- DVT – 0.01%
- Saphenous neuralgia, sural nerve injury
- Recurrence

Complications of Varicose Veins:

- Haemorrhage: Venous haemorrhage can occur from the ruptured varicose veins or sloughed varicose veins, often torrential, but can be controlled very well by elevation and pressure bandage.
- Eczema and dermatitis.
- Periostitis causing thickening of periosteum.
- Venous ulcer.
- Marjolin's ulcer.
- Lipodermatosclerosis.
- Ankylosis of the ankle joint.
- Talipes equino varus.
- Deep venous thrombosis.
- Calcifications.
- Thrombophlebitis.



Complication:

Venous ulcer (Graviational ulcer)

It is the complication of varicose veins or deep vein thrombosis.

Pathogenesis of venous ulcer:

Varicose veins or DVT which are recanalised, eventually causes chronic venous hypertension around ankle.

↓

Causes haemosiderin deposition in the subcutaneous plane from lysed RBC's

↓

Eczema

↓

Dermatitis

↓

Lipodermatosclerosis

↓

Fibrosis

↓

Anoxia

↓

Ulceration

- Area where venous ulcer commonly develop, is around and above the medial malleoli because of presence of large number of perforators which transmit pressure changes directly into superficial system. This area is called as Gaiter's zone. It can also be on both malleoli.
- Ulcer is often large, nonhealing, tendor, recurrent with secondary infection. Vertical group of inguinal lymphnodes are usually enlarged and tender.
- Often it leads to scarring, ankylosis, Marjolin's ulcer formation. Slough from the ulcer bed may give way causing venous haemorrhage.
- Periostitis is common which also prevents ulcer from healing.
- Most of the venous ulcers have surrounding lipodermatosclerosis. Lipodermatosclerosis is pigmentation, thickening, chronic inflammation and induration of the skin in calf and around ankle.
- Due to regular walking on toes so as to relieve the pain causes contraction and extra-articular fibrosis of Achilles tendon. Proper exercise is the remedy for-talipes equino varus.

Investigations:

- Discharge from the ulcer for culture and sensitivity.
- X-ray of the area to look for periostitis.
- Biopsy from the ulcer edge to rule out Marjolin's ulcer.
- Investigations to rule out other causes of leg ulcers like arterial; neurological; diabetes; sickle cell disease and other haemolytic diseases.
- Erythrocyte sedimentation rate; C reactive protein, peripheral smear; red cell counts.
- Doppler – venous and often arterial.

Treatment of venous ulcer:

Bisgaard method of treating venous ulcer:

- Measures to reduce oedema, increase venous drainage, so as to promote ulcer healing.
- Elevation.
- Massage of the indurated area and whole calf.
- Passive and active exercise.
- Pressure bandage (crepe bandage).
- Care of ulcer by regular cleaning with povidone iodine, H_2O_2.
- Dressing with EUSOL.

- Four layer bandage (45mm Hg pressure) technique to achieve high compression pressure. It is changed once a week.
- Antibiotics depending on culture and sensitivity of the discharge.

Once ulcer bed granulates well, split skin graft (SSG) is placed.

Specific treatment for varicose veins should be undertaken – Trendelengburg operation, stripping of veins, perforator ligation.

Fifty percent of venous ulcer occurs as a result of recanalisation of DVT, and the leg is commonly called as **postphlebitic limb (leg)**. It presents with all complications of venous diseases like eczema, ulceration, lipodermatosclerosis and venous ulcers. Here surgery for superficial varicose veins are contraindicated. Venous valve repair (**kistner's valvuloplasty)** or valve transplantation or drugs like **Stanazolol**, which reduces the fibrous tissue thereby increasing the oxygenation are beneficial.

Complications of venous ulcers

- Haemorrhage
- Marjolin's ulcer (in unstable scar of long duration)
- Infection
- Talipes equino varus
- Periostitis is common over the tibia
- Disability

- Calcification

EUSOL is Edinburgh University Solution Of Line containing boric acid, sodium hypochlorite, calcium hydroxide.)

Note:

- Present concept is to treat the ulcer first by compression bandage; regular dressing; skin grafting. Once ulcer has healed definitive procedure for varicose veins is done. Studies show that rapidity of healing of ulcer perse is not dependent on the surgery for varicose veins.
- Recurrence rate of venous ulcer after proper therapy is 30%.

  Reulcer formation is more in post phlebitis / thrombotic limb.

Compression therapy for varicose veins:

- Compression reduces the venous wall tension; prevents reflux; controls the venous over-distension.
- Compression diverts the blood towards deep veins through perforating veins; prevents the outward flow of blood in perforator incompetence; improves the efficacy of calf muscle pump. Compression reduces the oedema and improves the venous and lymphatic drainage; improves venous elasticity; improves the microcirculation and more important is it prevents further damage of the venous wall.

- Compression may be elastic / inelastic/ combination of elastic and inelastic (unna boot) multilayered (four layered) compression system which can provide sustained high compression for several days – usually up to a week / intermittent pneumatic compression. Unna boot is three-layered paste gauze compression dressing containing calamine, zinc oxide, glycerin, sorbitol, gelatin and aluminium silicate which has mainly inelastic inner component with partly elastic outer layer wrap.

Remember

- Compression improves ulcer healing rate.
- Supplementation of phlebotonic drugs in conjunction with compression therapy is accepted.
- Inelastic compression causes more improvement (reduction) in venous filling index (VFI) than elastic compression. But elastic compressin is more commonly used because it is better accepted.
- Multi-layered bandage system is most effective.
- Ankle-arm pressure index less than 0.6 is contra indication for compression therapy as it may precipitate ischaemic ulcer formation.
- Exercise may improve the muscle – pump action.

Compression garments standard

British standard

- Class I : 14 – 17 mm Hg
- Class II : 17 – 24 mm Hg
- Class III : 24 – 35 mm Hg

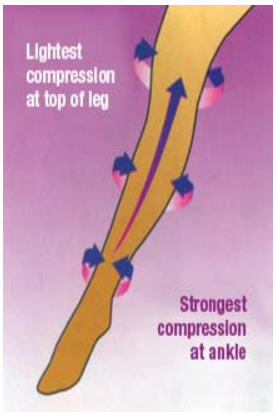
International (European) standard

- Class I : 20 – 30 mm Hg
- Class II : 30 – 40 mm Hg
- Class III : 40 – 50 mm Hg
- Class IV : 50 – 60 mm Hg

Compression bandages:

- Type I – Light weight confirming stretch bandages. These comprise light weight elastomer with high elasticity but little power. It is used to retain dressings.
- Type II (short stop) – Light support bandages. Minimal stretch. Exhibit limited elasticity but tends to lock out on minimal extension. In ambulant patient CVI they form an essentially inelastic covering to the leg which will exert pressure during calf systole but not during diastole. They are unsuitable for control of oedema.

- Type III (Long stop) – are extensible elastic and powerful to a varying degree.



VIII. RESULTS OF STUDY AND DISCUSSION

METHODOLOGY

This **prospective clinical study of primary varicose veins and its complications** was conducted in department of surgery at Tirunelveli Medical College and hospital, Tirunelveli between January-2011 and July-2012. Clearance was obtained from hospital ethical committee on **21.01.2011**.

During this period 100 patients having primary varicose veins were selected by purposive random sampling. Printed proforma was distributed to all units.All cases of varicose veins presenting to the OPD were subjected to Doppler study and USG abdomen to rule out secondary causes. Patients admitted with varicose vein who satisfied the inclusion and exclusion criteria were included in the study. All the required data was collected from patients during their stay in the hospital, during follow up at regular intervals and from medical records.

Inclusion criteria:

- Patients admitted with varicose veins between 21.01.11 to 27.07.12.
- Patients managed surgically.
- Patients with venous Doppler report of affected limb.

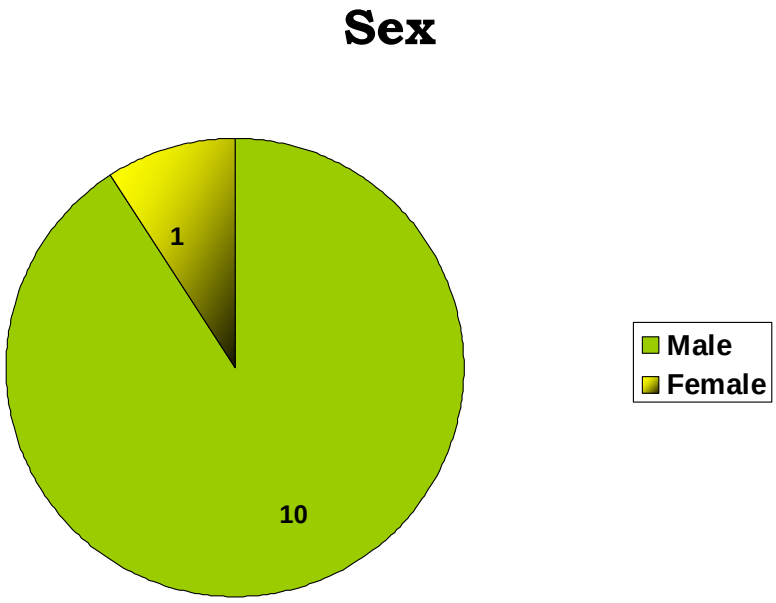
- USG abdomen should be done.
- Patients who had follow up of at least 6 months after surgery.

Exclusion criteria:

- Patient managed conservatively.
- Patient not willing for surgery.
- Patients who did not follow up for at least 6 months after surgery.
- Patients without USG abdomen report.
- Patient without report of venous Doppler of affected limb.
- Patients who were unfit for surgery.
- All patients with secondary varicose veins (secondary to arteriovenous fistula, iliac vein thrombosis DVT, pelvic tumour) were excluded from study.

Table1 : SEX DISTRIBUTION

SEX	NO OF PATIENTS	PERCENTAGE
Male	90	90%
Female	10	10%



Male : Female

10 : 1

Table 2 AGE DISTRIBUTION

AGE DISTRIBUTION	NO OF PATIENTS	PERCENTAGE
11 – 20	1	1%
20 – 30	23	23%
31 – 40	29	29%
41 – 50	26	26%
51 – 60	16	16%
61 – 70	4	4%
71 – 80	1	1%

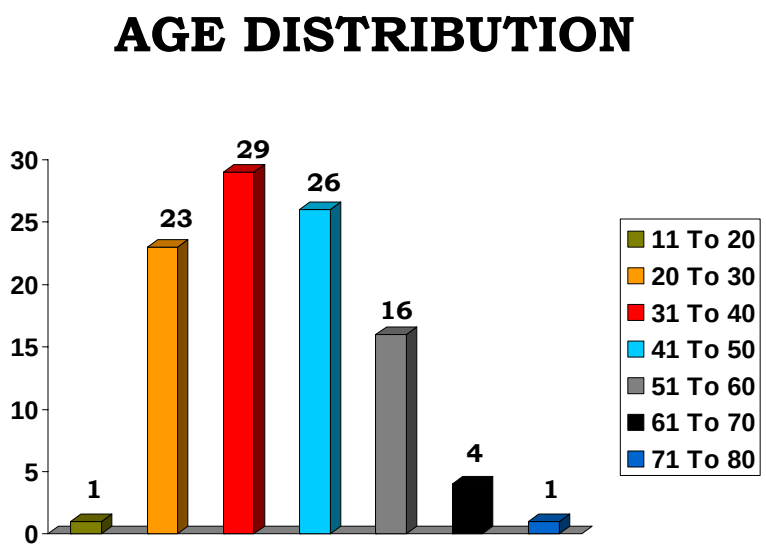


Table 3: OCCUPATION DISTRIBUTION

OCCUPATIONS	NO OF PATIENTS	PERCENTAGE
Agriculture	48	48%
Builders	25	25%
Other profession	8	8%
Not working	10	10%
House wife	9	9%

OCCUPATION

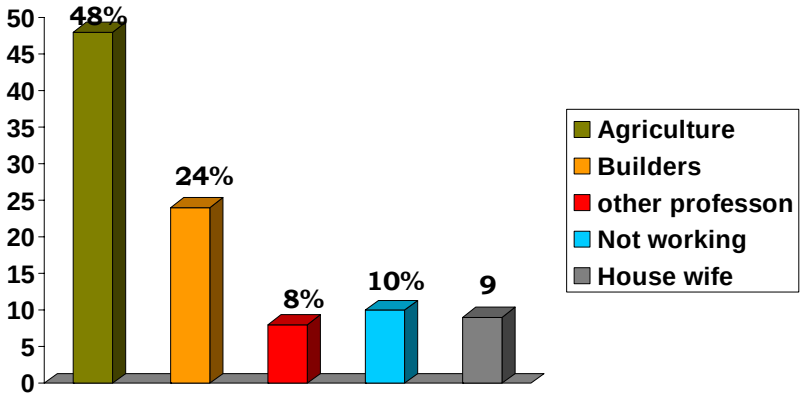


Table 4 : COMPARISION OF INCIDENCE OF SIDES

	NO OF PATIENTS	PERCENTAGE
Right limb above	41	41%
Left limb above	48	48%
Bilateral	11	11%

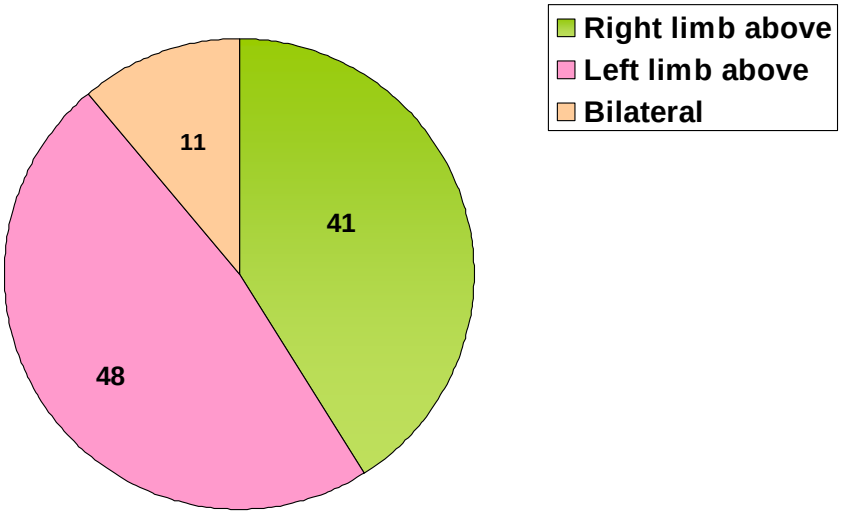


Table 5. DISTRIBUTION OF VARICOSE SYSTEMS

	NO OF PATIENTS	PERCENTAGE
Long saphenous vein	35	35%
Short saphenous vein	3	3%
Only perforator	5	5%
Long saphenous + perforator	57	57%

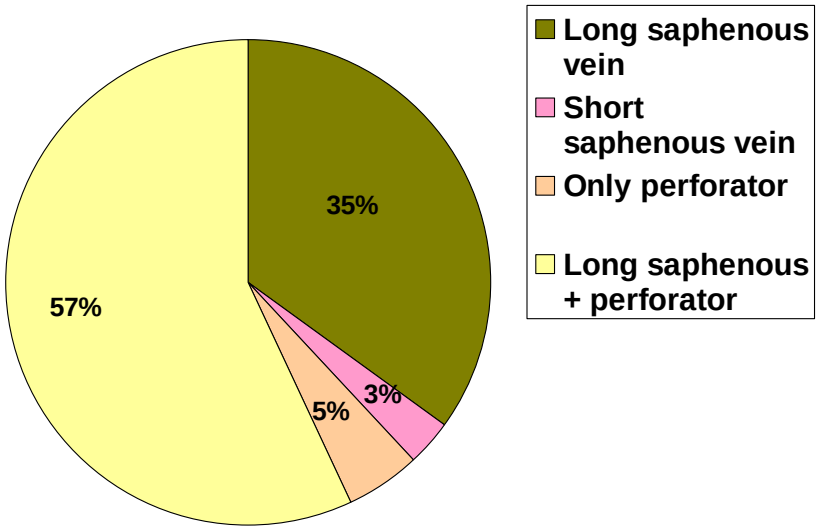


Table 6: DISTRIBUTION OF SYMPTOMS

COMPLICATIONS	NO OF PATIENTS
Pain	55
Edema	17
Ulcer	14
Disfigurement	29
Cramps	0

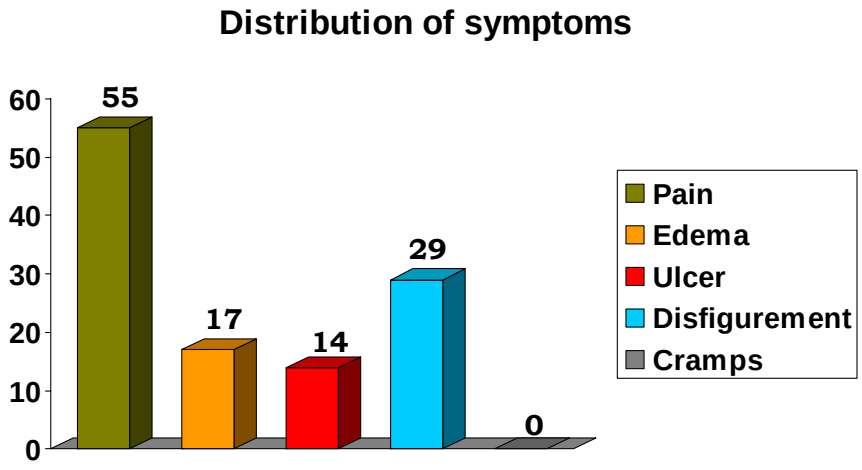


Table 7. DISTRIBUTION OF COMPLICATIONS

COMPLICATIONS	RIGHT	LEFT	TOTAL
Haemorrhage	0	0	0
Thrombophelitis	0	1	1
Pigmentation	28	31	59
Dermatitis	13	15	28
Eczema	4	6	10
Lipodermatosclerosis	6	10	16
Ulcer	7	7	14
Equine deformity	0	0	0

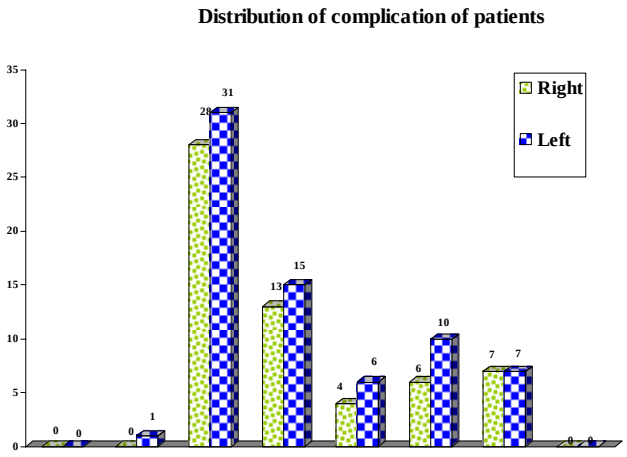
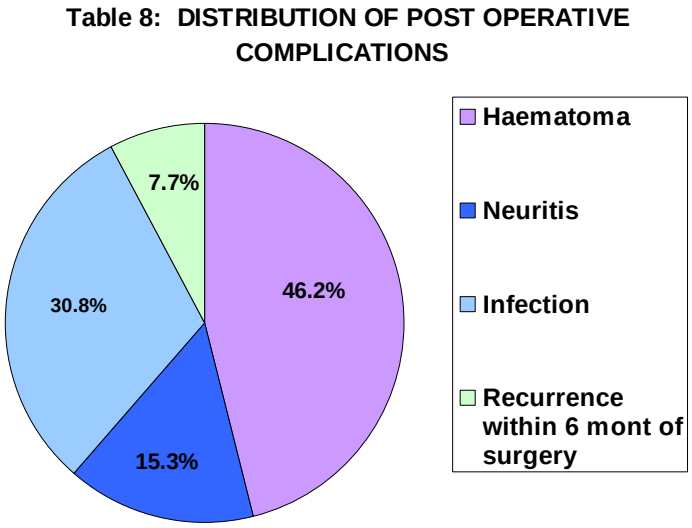


Table 8: Post operative complications:

Of the 100 limbs operated, 26 patietns develoed complication 12 (12%) developed haematoma, 4 (4%) developed saphenous neuritis and 8 (8%) developed infection., 2 (2%) developed recurrence

Table 8: DISTRIBUTION OF POST OPERATIVE COMPLICATIONS

COMPLICATIONS	NO OF PATIENTS	PERCENTAGE
Haematoma	12	46.2%
Neuritis	4	15.3%
Infection	8	30.8%
Recurrence within 6 month of surgery	2	7.7%
Total	26	100%



- Out of 100 cases 4 patients were recurrent varicose veins.
- Out of 100 cases 11 patients had bilateral varicose veins. But were operated on symptomatic side.
- Out of 100 cases 14 cases had ulcer over either medial or lateral malleolus which was managed by Bisgaard regimen and then taken up for surgery.

DISCUSSION

The incidence of varicose veins in females is ten times more than in males. In this prospective study of 100 patients, only 10 patients were females (10%). This is due to the fact that Indian women wear saree that covers their legs up to the feet, unlike western women whose costume wear may reveal their legs, hence Indian women are less concerned about the cosmetic disfigurement which may account for their decreased incidence in seeking treatment. In this study age incidence was maximum in the group 31 – 40 which accounted for 29% of patients followed by 26 patients (26%) in the group 41-50. In this study most of the patients were agriculturalists (48%) by occupation ansd 25 other patients who admitted of having been exposed to prolonged hours of standing, about 10 hours per day. This may point towards the possibility of prolonged erect posture being the aetiology for varicose veins.

Among the 100 limbs studied, commonest system involved was long saphenous and communicating system 57 limbs, 57%), next was long saphenous involvement along (35, 35%), least involved short saphenous system alone(3 limb, 3%). Left side was found to be involved more than the right side. Among the various symptoms with which the patients presented, pain was the commonest symptom seen in 55 limbs

(55%) followed by disfigurement 29 limbs (29%), ulcer 14 limbs (14%) oedema 17 limbs (17%). None of the patients had cramps. Of the various systems involved, limbs with long saphenous and communicating system involvement had more symptoms than any other , followed by limbs with long saphenous and short saphenous involvement and long saphenous involvement alone.

In a study conducted by T.Sakurai, P.C.Gupta, M.Matsushita, N. Nishikimi and Y.Nimura, it was found that, of the 266 limbs examined, long saphenous and communicating system involvement was seen in 118 (44%) and long saphenous involvement alone was seen in 56 (21%). They showed that these were the commonest patterns involved. They also showed that limbs with long saphenous and short saphenous involvement or long saphenous and communicating system involvement were associated with severe venous disease.

Among the various complications pigmentation was the commonest seen in 28 limbs (40%) followed by ulceration 15 limbs (21.4%), dermatitis 14 limbs (20%), eczema 8 limbs (11.4%), lipodermatosclerosis 6 limbs (8.5%) haemorrhage, DVT, periostitis, stiffness and equinus were not seen in any of them.

Among the various modalities of treatment, 48 of 70 limbs were subjected to surgery, 20 were conserved and 2 were subjected to sclerotherapy. The commonest operation performed was

saphenofemoral flush ligation with stripping of LSV and subfascial ligation of perforators in 26 limbs (54.1%), followed by saphenofemoral flush ligation with stripping of LSV 10 limbs (20.8%). Least common operation was saphenofemoral flush ligation with stripping of LSV with saphenopopliteal junction ligation with subfascial ligation of perforators (2%). Post operative compression was followed routinely for all patients to prevent haematoma formation. All patients were advised to use elastic crepe bandage for 2 months after discharge from the hospital.

Among the post operative complications haematoma, was the commonest (6 limbs 12.5%) probably due to loose application of post operative compression bandage. 2 limbs had saphenous neuritis and 2 limbs had infection. Low incidence of neuritis could be because of good surgical technique and due to the fact that most patients were agriculturalists who were not bothered by slight impairment of sensation. Low incidence of infection could be due to good antibiotic coverage coupled with sterile theatre technique. The complications responded well to surgical treatment. Among 14 patients with varicose ulcer 6 needed grafting, rest healed without any intervention.

Of the 100 patients 23 came for follow up and had no recurrence. 2 patients were subjected to sclerotherapy who never turned up.

IX. CONCLUSION

100 patients of primary varicose veins of lower limbs were admitted to Tirunelveli medical college and hospital and a prospective study of these patients revealed,

1) Commonest age group affected is 31-40 years.

2) Definite relationship exists between occupation involving prolonged standing and primary varicose veins.

3) The involvement of long saphenous and communicating system is commonest followed by long saphenous involvement alone.

4) Pain is the commonest symptom.

5) Patients with involvement of long saphenous and communicating system or long saphenous and short saphenous system had more symptoms than the others.

6) Commonest complication is pigmentation.

7) Complications of varicose veins responded well to operative treatment.

8)Results of surgical treatment are good .

9) Mortality is nil.

SUMMARY

In this prospective clinical study of primary varicose veins and its complications , 100 cases of varicose veins presenting to the OPD were subjected to Doppler scan patients admitted with varicose veins who satisfied both inclusion and exclusion criteria were included in the study. Cases with complications were initially treated conservatively, later subjected to operative treatment. Patients who had bilateral limb involvement got their symptomatic limb operated first while the other limb was managed conservatively which was not included in the study. Patients with saphenofemoral incompetence was treated with saphenofemoral junction ligation and stripping of long saphenous vein, patients with saphenopopliteal incompetence was treated by saphenopopliteal junction ligation with or without stripping of short saphenous vein. Patients with perforator incompetence were treated with multiple phlebectomies.

From this study we conclude that commonest age group affected were 31-40 years. Definite relationship exists between occupation involving prolonged standing and primary varicose veins, the involvement of long saphenous and communicating system is commonest followed by long saphenous involvement alone. Pain is the commonest

symptom. Commonest complication was pigmentation. Complications of varicose veins responded well to operative treatment. Results of surgical treatment are good.

KEY POINTS IN CLINICAL PRACTICE

- Management of varicose veins is a grossly ill understood entity in clinical practice.
- A proper anatomy and pathophysiology is mandatory for successful management of varicose veins.
- Solutions for high recurrence rates and unlocking the mystery of neovascularization are unresolved clinical issues.
- Follow – ‘horses – for – courses ‘ policy and familiarise oneself with as many modalities possible and offer the patient a suitable modality.
- Though there are minimally invasive modalities such as endo-venous laser, RFA from sclerothrapy. Still the ‘ gold standard’ is surgery.

PROFORMA

X. PROFORMA

History taking:

Name :

Age :

Sex : More common in women 10 : 1 ratio

Occupation : More common in jobs having prolonged standing,

e.g. Policeman, petrol bunk workers, tram drivers etc.

Symptoms:

1. Asymptomatic
2. Aching pain
3. Bursting type of pain while walking (deep vein thrombosis)
4. Ulcers
5. Appearance of varicosity

H/o Suggestive Secondary Causes:

1. H/o pregnancy
2. H/o prolonged immobilisation
3. H/o oral contraceptive pill consumption
4. H/o constipation

Past history:

No H/o diabetes, hypertension, ischemic heart disease, bronchial asthma, tuberculosis.

Personal history:

- H/o smoking and alcoholism
- H/o diet.

Family history:

- Similar H/o in the family.

General Examination:

Anemia,

Cyanosis,

Jaundice,

Clubbing,

Lymphadenopathy,

Examination of other systems:

CVS: Normal heart sound

RS : Normal vesicular breath sounds

Abdomen : Palpable mass

1. Pregnancy
2. Fibroid
3. Ovarian cyst
4. Carcinoma cervix or rectum.

CNS : No focal neurological deficit.

Examination of varicose vein:

Inspection

Palpation

Percussion

Auscultation

Inspection:

Varicose veins : Dilated, elongated and tortuous veins.

1. Examine which system is involved.

   Short saphenous system – Lateral side

   Great saphenous system – Medial side

2. Swelling of the leg:

   Localised : Superficial venous system is affected.

   Generalised : May be due to deep vein thrombosis

3. Skin changes in the leg:

   i. Color : Local redness : Superficial thrombophlebitis.

   ii. Texture: Stretched skin

   Eczema / pigmentation

   Ulceration

   Scars

   Loss of hair and brittleness of nail – Impending Gangrene

Palpation:

Examine the lower limb for

1. Thickening of skin
2. Pitting edema
3. Tenderness
4. Redness
5. Lipodermatosclerosis
6. Varicose venous ulcer.

I. Brodie – Trendelenburg

Test- 1 : For sapheno – femoral incompetence

Test-2 : For perforator incompetence

II. Three tourniquet test or multiple tourniquet test

Short saphenous venous incompetence

III. Perthes ‘ Test

IV. Modified perthes’s test

V. Pratt’s Test

VI. Fegan’s Test

VII. Schwartz’s Test

VIII. Morrisey’s cough impulse

IX. Test for deep vein thrombosis

Diagnosis

1. Primary or secondary varicose vein.
2. Involving great saphenous or short saphenous or both venous system.
3. With or without saphenofemoral incompetence or saphenopopliteal incompetence.
4. With or without perforator incompetence.
5. With clinical class.
6. With or without complications.

Procedure done.

Operating notes.

Post operative period.

Un evenful :

Complicated :

Nature of Complication :

Conditions on discharge :

Follow up advice :

KEY TO MASTER CHART

A	-- Agriculturist
B	--Business
DVT	--Deep vein thrombosis
L	--Left
LSV	--Long Saphenous Vein
PI	--Perforator Incompetence
R	--Right
R-LSV	--Recurrent Long saphenous vein
SFLP	--Subfascial Ligation of Perforators
S	--Stripping of Long saphenous Vein
SSV	--Short Saphenous Vein
SFFL	--Saphenofemoral Flush Ligation
SFJI	--Saphenofemoral Junction Incompetence
SPJL	--Saphenopopliteal Junction Ligation
MP	--Multiple phlebectomies
+	--Present
_	--Absent

MASTER CHART

Sl.No	Name	Age	Sex	IP No	Date of surgery	Unit	Side	Doppler report	Treatment
1	Muruganantham	45	M	257	21-Jan-11	S1	R	SFJI+PI	SFFL+S+MP
2	Niyan	25	M	52065	24-Jan-11	S4	R	SFJI+PI	SFFL+S+MP
3	Murugan	47	M	55175	25-Jan-11	S3	L	SPJI	SPJL
4	Ramalakshmi	46	F	52779	26-Jan-11	S7	R	SFJI+PI	SFFL+S +MP
5	Arumugam	42	M	4550	14-Feb-11	S6	R	SFJI+PI	SFFL+S+MP
6	Indira	38	F	5642	18-Feb-11	S6	R	SFJI+PI	SFFL+S+MP
7	Subbiah	27	M	6294	19-Feb-11	S3	L	SFJI+PI	SFFL+S+MP
8	Selvaraj	31	M	10766	18-Mar-11	S2	R	SFJI+PI	SFFL+S+MP
9	Durai	60	M	13856	27-Mar-11	S6	R	SFJI+PI	SFFL+S +MP
10	Vallinayagam	47	M	13490	2-Apr-11	S4	R	SFJI+PI	SFFL+S +MP
11	Karuppasamy	29	M	14630	6-Apr-11	S4	L	SFJI+PI	SFFL+S
12	Mariappan	36	M	15040	6-Apr-11	S1	L	SFJI+PI	SFFL+S
13	Mariappan	48	M	16036	9-Apr-11	S7	Bilateral	SFJI+PI	SFFL+S+MP
14	Rajamani	55	M	18929	10-Apr-11	S4	L	SFJI+PI	SFFL+S+MP
15	Ramalingam	20	M	16020	18-Apr-11	S6	L	SFJI+PI	SFFL+S
16	Selvaraj	30	M	23495	6-May-11	S2	Bilateral	SFJI+PI	SFFL+S+MP
17	Subbulakshmi	28	F	20151	14-May-11	S4	R	SFJI+PI	SFFL+S+MP
18	Sankar raj	40	M	20840	14-May-11	S1	L	SFJI+PI	SFFL+S
19	Murugan	35	M	20896	18-May-11	S1	L	SFJI+PI	SFFL+MP
20	Iyyappan	24	M	21958	28-May-11	S1	L	PI	MP

Sl.No	Name	Age	Sex	IP No	Date of surgery	Unit	Side	Doppler report	Treatment
21	Subramanian	50	M	22801	31-May-11	S5	R	SFJI+PI	SFFL+SFLP
22	Kani	59	F	23287	1-Jun-11	S1	L	SFJI+PI	SFFL+S
23	Ayyadurai	53	M	26167	21-Jun-11	S3	R	SFJI+PI	SFFL+SFLP
24	Kumaresan	50	M	36760	28-Jun-11	S7	R	SFJI+PI	SFFL+SFLP
25	Mariappan	24	M	28418	2-Jul-11	S1	R	SFJI+PI	SFFL+S
26	Gopalakrishnan	32	M	29583	2-Jul-11	S7	L	SFJI+PI	SFFL+SFLP
27	Mariappan	40	M	28829	5-Jul-11	S3	L	SFJI+PI	SFFL+S
28	Mustafa	30	M	32103	13-Jul-11	S1	R	SFJI+PI	SFFL+S
29	Sakkaian	38	M	32343	15-Jul-11	S2	R	SFJI+PI	SFFL+S+MP
30	Durai	30	M	35023	3-Aug-11	S4	L	SFJI+PI	SFFL+S+MP
31	Murugan	50	M	43144	3-Aug-11	S2	Bilateral	SFJI+PI	SFFL+S
32	Gomathinayagam	47	M	43387	3-Aug-11	S2	R	SFJI+PI	SFFL+S
33	Balachandran	45	M	43388	4-Aug-11	S3	L	SFJI+PI	SFFL+S
34	Sundaresan	36	M	36036	9-Aug-11	S3	L	SFJI+PI	SFFL+S
35	Mohamed ismail	25	M	35989	16-Aug-11	S3	L	SFJI+PI	SFFL+S+MP
36	Mohamed ali	38	M	36939	19-Aug-11	S2	L	SFJI+PI	SFFL+S
37	Shanmugathai	42	F	47914	3-Sep-11	S2	R	SFJI+PI	SFFL+S
38	Mohamed ibrahim	53	M	40817	5-Sep-11	S2	R	SFJI+PI	SFFL+S+MP
39	Ramkumar	30	M	41147	7-Sep-11	S1	L	PI	MP
40	Mookaiah	49	M	50315	15-Sep-11	S3	L	SFJI+PI	SFFL+S+MP

Sl.No	Name	Age	Sex	IP No	Date of surgery	Unit	Side	Doppler report	Treatment
41	Selvaraj	50	M	42185	21-Sep-11	S1	R	SPJI	SPJL
42	Beer mohideen	63	M	43342	23-Sep-11	S6	L	SFJI+PI	SFFL+S
43	Ganesan	48	M	50788	25-Sep-11	S3	R	SFJI+PI	SFFL+S
44	Arumugam	60	M	51981	25-Sep-11	S3	Bilateral	SFJI+PI	SFFL+S+MP
45	Shanmugam	55	M	44877	12-Oct-11	S1	R	SFJI+PI	SFFL+S
46	Guruvammal	37	F	54558	13-Oct-11	S3	R	SFJI+PI	SFFL+S+MP
47	Shanmugasundaram	71	M	50343	2-Nov-11	S1	R	SFJI+PI	SFFL+S
48	Madasamy	42	M	50306	5-Nov-11	S1	R	SFJI+PI	SFFL+S
49	Natarajan	52	M	50271	9-Nov-11	S1	L	SFJI+PI	SFFL+S+MP
50	Sundar rajan	23	M	51586	9-Nov-11	S1	L	SFJI+PI	SFFL+S
51	Kottaisamy	25	M	52402	17-Nov-11	S5	L	SFJI+PI	SFFL+S
52	Muthu	22	M	52038	22-Nov-11	S3	Bilateral	SFJI+PI	SFFL+S+MP
53	Mariappan	43	M	54697	26-Nov-11	S3	L	SFJI+PI	SFFL+S
54	Murugan	40	M	54430	2-Dec-11	S2	Bilateral	SFJI+PI	SFFL+S+MP
55	Karuppiah	38	M	59456	23-Dec-11	S2	L	SFJI+PI	SFFL+S
56	Muthuraj	36	M	59467	30-Dec-11	S2	R	SFJI+PI	SFFL+S
57	Socairaja	55	M	2058	18-Jan-12	S1	L	SFJI+PI	SFFL+S+MP
58	Mariappan	21	M	4233	28-Jan-12	S1	R	SFJI+PI	SFFL+S
59	Ashan basha	24	M	4399	31-Jan-12	S3	R	SFJI+PI	SFFL+S
60	Kumar	25	M	6015	9-Feb-12	S7	R	SFJI+PI	SFFL+S

Sl.No	Name	Age	Sex	IP No	Date of surgery	Unit	Side	Doppler report	Treatment
61	Sankarapandi	44	M	8354	15-Feb-12	S1	L	SFJI+PI	SFFL+S+MP
62	Bose	33	M	8360	18-Feb-12	S1	L	SFJI+PI	SFFL+S
63	Balaji	28	M	10998	29-Feb-12	S1	Bilateral	SFJI+PI	SFFL+S+MP
64	Rajamani	31	M	10536	1-Mar-12	S5	R	SFJI+PI	SFFL+S+MP
65	Ayyadurai	48	M	10852	10-Mar-12	S7	R	PI	MP
66	Maragathasundaram	54	M	12445	14-Mar-12	S1	R	SFJI+PI	SFFL+S
67	Seetharaman	63	M	17038	10-Apr-12	S3	L	SFJI+PI	SFFL+S+MP
68	Murugababu	56	M	18558	11-Apr-12	S4	R	SFJI+PI	SFFL+S+MP
Sl.No	**Name**	**Age**	**Sex**	**IP No**	**Date of surgery**	**Unit**	**Side**	**Doppler report**	**Treatment**
69	Aruldhas	40	M	19204	14-Apr-12	S1	L	SFJI+PI	SFFL+S+MP
70	Abbas	31	M	20381	19-Apr-12	S7	L	SFJI+PI	SFFL+MP
71	Devarajan	57	M	19662	21-Apr-12	S3	R	SFJI+PI	SFFL+S+MP
72	Gomu	50	F	22742	9-May-12	S4	L	SFJI+PI	SFFL+S+MP
73	Inbaraj	18	M	26846	18-May-12	S2	R	SFJI+PI	SFFL+S
74	Murugesan	29	M	26529	19-May-12	S1	R	SFJI+PI	SFFL+S+MP
75	Natarajan	52	M	25358	19-May-12	S3	R	SFJI+PI	SFFL+S+MP
76	Lingaraja	41	M	28190	26-May-12	S7	R	SFJI+PI	SFFL+S
77	Ponmani	33	F	28972	26-May-12	S3	R	SFJI+PI	SFFL+S+MP
78	Pauldurai	31	M	27459	26-May-12	S4	L	PI	MP
79	Ramachandran	46	M	30219	30-May-12	S1	L	SFJI+PI	SFFL+S+MP
80	Balakrishnan	32	M	31220	2-Jun-12	S1	L	SFJI+PI	SFFL+S+MP

Sl.No	Name	Age	Sex	IP No	Date of surgery	Unit	Side	Doppler report	Treatment
81	Ramar	23	M	30969	2-Jun-12	S4	L	SFJI+PI	SFFL+S
82	Krishnan	55	M	28820	7-Jun-12	S2	L	SPJI	SPJL
83	Velsamy	60	M	32365	9-Jun-12	S3	L	SFJI+PI	SFFL+S+MP
84	Ganesan	48	M	32342	12-Jun-12	S3	L	SFJI+PI	SFFL+S
85	Valliammal	55	F	32501	13-Jun-12	S4	L	SFJI+PI	SFFL+S+MP
86	Ganesan	40	M	33694	15-Jun-12	S2	R	SFJI+PI	SFFL+S+MP
87	Muthukumar	40	M	31976	16-Jun-12	S1	L	SFJI+PI	SFFL+S
88	Manikandan	38	M	33002	18-Jun-12	S6	L	SFJI+PI	SFFL+S+MP
89	Arumugam	33	M	30139	21-Jun-12	S7	L	SFJI+PI	SFFL+S+MP
90	Sankar	42	M	34649	21-Jun-12	S7	R	SFJI+PI	SFFL+S
91	Asad fathima	32	F	55397	23-Jun-12	S1	R	SFJI+PI	SFFL+S+MP
92	Mohamed yusuf	50	M	54054	26-Jun-12	S7	R	SFJI+PI	SFFL+S+MP
93	Antonymuthu	45	M	37151	30-Jun-12	S4	L	SFJI+PI	SFFL+S+MP
94	Sukumar	43	M	44158	30-Jun-12	S1	R	SFJI+PI	SFFL+S
95	Muthukanagaraj	22	M	37046	7-Jul-12	S7	R	SFJI+PI	SFFL+S+MP
96	Ganesan	38	M	44552	7-Jul-12	S1	L	SFJI+PI	SFFL+MP
97	Paramasivan	65	M	52679	10-Jul-12	S7	L	SFJI+PI	SFFL+S
98	Saravana karthik	35	M	41601	14-Jul-12	S1	L	PI	MP
99	Angappa pillai	60	M	53972	20-Jul-12	S7	Bilateral	SFJI+PI	SFFL+S+MP
100	Thangadurai	40	M	41676	20-Jul-12	S1	L	SFJI+PI	SFFL+MP

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